GENERAL INDEX

A

Accumulation, of ions in *Nitella*, 473
Acetone, lipide solvent, 166
  purification of chlorophyll, 490
ADDOMS, RUTH M., A laboratory manual of botany, 524
Agaricus campestris, effect of H-ion on growth, 91
Agricultural Institute, TIMIRIAZEFF, 227
Agronomy meeting, 98
Alcohol, lipide solvent, 166
Algae, marine, photosynthesis, 87
Aluminum, stimulation, 293
  toxicity, 293
Anatomical material for study of growth differentiation, 459
Anions and accumulation of Br in *Nitella*, 475
Annual meeting, fifth, 361, 519
Antagonism, 477
Apparatus, aspiration, for nitrogen determination, 501
  for controlled environments, 277
  for drying plant materials, 515
Apple, respiration of twigs, 46
Ash analyses, lettuce, 205
  of chlorophyll, 495
Aspiration apparatus, for nitrogen determination, 501
Award, life membership, 98

B

Bacteria, luminous, 85
BAKER, C. L., Effect of sunshine and shape of fruit on rate of ripening of tomato, 513
BANG'S classification of lipides, 158
BARNES, CHARLES REID, life membership award, 98
Beans, red kidney, zinc and growth, 219
  Windsor, zinc and growth, 219
BEAUMONT, J. H., Effect of CO_2 on respiration, 45
BECK, WILLIAM A., Osmotic pressure, osmotic value and suction tension, 413
Beet, 96
BENEDICT, HARRIS MILLER, obit, 522
Benzene, lipide solvent, 165
Bibliography, seed germination, 233
Biochemical laboratory methods, CLARENCE A. MORROW, 100
Biological reactions, similar to physicochemical, 79
Biophysics, physical chemistry and, MATTHEW STEEL, 99
BLOOR'S classification of lipides, 160
Books of historical value, 360
Boron, effects of absence on cell and tissue structure, 237
Botany, elements of, HOLMAN and ROBBINS, 524
  laboratory manual of, FISK and ADDOMS, 524
  textbook of general, Wisconsin, 524
BOUILLENNE, RAY, Anatomical material for study of growth differentiation, 459
BRIERLEY, W. G., Hardiness of *Vaccinium*, 303
BROWN, H. D., Effect of sunshine and shape of fruit on rate of ripening of tomato, 513
Bubbles, and periodic precipitation, 107
Buckwheat, zinc essential for growth, 217
Buffer system of wheat plant, changes during development, 131
Burning quality of tobacco, leaf constituents and, 185

C

Cabbage, high temperature and growth, 95
Calcium balance, in relation to metabolism, 261
Capillary spaces and periodic precipitation, 105, 119
Carbon dioxide, effect on plant respiration, 45
  disulphide, lipide solvent, 165
  tetrachloride, lipide solvent, 163

Carotin, extraction from fresh leaves, 211
Cations, effect on accumulation of Br in *Nitella*, 475
Cell structure, effects of absence of boron on, 237
Chemistry, and physics, handbook, 524
institute of, 231
physical, and biophysics, MATTHEW STEEL, 99
starch, ROBERT P. WALTON, 362
Chloroform, lipide solvent, 165
Chlorophyll, development in different wave-lengths of light, 71
extraction from fresh leaves, 211
investigations, translation of WILLSTÄTTER and STOLL by F. M. SCHERTZ and A. R. MERZ, 99
preparation, 487
quantitative determination, 323
Chlorophyllin, 331
CHRISTENSEN, LEO M., Nitrogen content of *Mycoderma* and *Saccharomyces*, 61
Classification of lipides, 157
CLEMENTS, HARRY F., Plant nutrition studies, triangular system, 441
Cobalt sulphide, periodic precipitation of, 109
Colloid symposium, sixth national, 98, 231, 359
Colloids, pineapple stem, 309
Colorimetric determination of chlorophyll, 325
Committee, life membership award, 361
membership, 362
program, 99
STEPHEN HALES prize, 361
Concentration of ions and accumulation of ions in *Nitella*, 474
Conductance measurements in seed viability study, 335
Conference, international nitrogen, 360
Coniferous-tree seed, germinative energy, 365
Constitution, new, 520
Corn, 266
Costs of publication, 521
of reprints, 521
CRAMER'S classification of lipides, 158
Critical tables, international, 233, 523
Crop plants, metabolism and mineral balance, 261
Cypress, smooth, seed germination, 404

D

DAVIS, A. R., Apparatus for controlled environment, 277
Influence of ions on accumulation of other ions in *Nitella*, 473
Determination of inorganic nitrogen, 499
Development, of chlorophyll in seedlings, 71
of wheat plant, changes in buffer system, 131
Differentiation, growth, anatomical material for study, 459
Driers, plant material, 515

E

Elements, essential, effects of absence, 237
of botany, HOLMAN and ROBBINS, 524
Endive, 201
Environment, apparatus for control, 277
Errata, vol. 3, 1928, at close table of contents, iv
vol. II, 1927, 99
Estimation of lipides, 155
Ether, ethyl, lipide solvent, 163
petroleum, lipide solvent, 163
purification of chlorophyll, 490
Extraction of chlorophyll, carotin, and xanthophyll, 211

F

FISHER, R. A., Statistical methods for research workers, 525
FISK, EMMA L., A laboratory manual of botany, 524
Flavones, 212
FREAR, DONALD, Effect of H-ion on growth of *Agaricus*, 91
Fruits, tomato, effect of sunshine and shape on rate of ripening, 513
Fucus, photosynthesis, 87
Fund, STEPHEN HALES prize, 97
FURMAN, N. HOWELL, Translation of KOLTHOFF, indicators, 234

Translation of KOLTHOFF, potentiometric titrations, 234

G

Germination, and rate of reduction, 343
seed, bibliography, 233
Germinative energy of coniferous-tree seed, 365
GILBERT, BASIL E., Aluminum toxicity, 293
Growth, apparatus for controlled environments for, 277
differentiation, anatomical material for study, 459
of *Agaricus campestris*, effect of H-ion, 91
of cabbage, effect of high temperature, 95
of certain leaf vegetables, related to muck-soil reaction, 199
of higher preen plants, essential nature of zinc for, 217
of wheat, under constant conditions, 1, 7

H

HAASIS, FERDINAND W., Germinative energy of coniferous-tree seed, 365
HALES, STEPHEN, prize, 361
committee of award, 232
fund, 97
HALEY, D. E., Burning quality of tobacco, 185
Effect of H-ion on growth of *Agaricus*, 91
Handbook of chemistry and physics, 524
HARDENBURG, E. V., Muck-soil reaction and growth of vegetables, 199
Hardiness, of *Vaccinium*, 303
HARVEY, E. N., Photosynthesis in absence of O_2, 85
HARVEY, R. B., Plant physiology in Russia, 353
TIMIRIAZEFF and the TIMIRIAZEFF Agricultural Institute, 226
Hemicelluloses, 446
HENDRICKSON, A. H., Soil moisture at permanent wilting of plants, 355
HIBBARD, P. L., Influence of one ion on accumulation of another in *Nitella*, 473
HIBBARD, R. P., Seed viability, biochemical studies, 335
HILDRETH, A. C., Hardiness of *Vaccinium*, 303
HOAGLAND, D. R., Apparatus for controlled environment, 277
Influence of one ion on accumulation of another in *Nitella*, 473
HOLMAN, R. M., Elements of botany, 524
Humidity, control, 290
HURD-KARRER, ANNIE M., Changes in buffer system of wheat plant, 131
Hydrogen ion concentration, 131
and accumulation of Br in *Nitella*, 482
effect on *Agaricus campestris*, 91

I

Illumination, control, 289
Incubation temperature, and germinative energy of coniferous-tree seed, 365
duration, and germinative energy of coniferous-tree seed, 365
Indicators, I. M. KOLTHOFF, FURMAN translation, 234
Institute, agricultural, TIMIRIAZEFF, 227
of chemistry, 231
International critical tables, 233, 523
nitrogen conference, 360
Investigations on chlorophyll, WILLSTÄTTER and STOLL, translation by SCHERTZ and MERZ, 99
Ion accumulation in *Nitella*, influence of other ions on, 473
Iriartea exorrhiza, 461
Iron balance, in relation to metabolism, 261
starvation, 249
Isosmotic coefficients, 420

K

KOLTHOFF, I. M., Indicators, FURMAN translation, 234
Potentiometric titrations, FURMAN translation, 234

L

Laboratory manual of botany, FISK and ADDOMS, 524
methods, biochemical, MORROW, 100

Leaf constituents, and burning quality of tobacco, 185
vegetables, muck-soil reaction and growth, 199
LEATHES'S classification of lipides, 157
Lettuce, 201
LEVINE'S classification of lipides, 160
Life membership award, 98
committee, 361
Light, different ranges of wave-length and chlorophyll development, 71
Lipides, estimation, 155
List, membership, 232
LLOYD, F. E., Life membership award, 98
Studies in periodic precipitation, 101
LOEHWING, WALTER F., Calcium, potassium, and iron balance and metabolism, 261
Luminous bacteria, 85

M

MACLEAN'S classification of lipides, 159
Magnesium starvation, 244
Manganese starvation, 245
Manual, laboratory, of botany, FISK and ADDOMS, 524
Manuscripts, size, 520
carbon copies, 521
MATHEWS'S classification of lipides, 159
MCLEAN, FORMAN T., Aluminum toxicity, 293
Meeting, agronomy, 98
fifth annual, 361, 519
Nashville, 97
Summer, Purdue University, 231, 361, 519
Membership, life, award, 98
committee, 361
list, 232
MERZ, ALBERT R., Investigations on chlorophyll translation of WILLSTÄTTER and STOLL, 99
Metabolism, relation of calcium, potassium, and iron balance to, 261
nitrogen, in soy beans, 31
Methods, biochemical laboratory, CLARENCE A. MORROW, 100
of analysis, 32, 64, 167, 189, 263, 444, 499
of extraction and purification of chlorophyll, 488
statistical, FISHER, 525
MILLER, E. V., Seed viability, biochemical studies, 335
MILLER, JULIAN C., Effect of high temperature on growth of cabbage, 95
Moisture, soil, at permanent wilting of plants, 355
MORAVEK, V., Studies in periodic precipitation, 101
MORROW, CLARENCE A., Biochemical laboratory methods, 100
Muck-soil reaction, relation to growth of leaf vegetables, 199
Mustard, 201
Mycoderma, nitrogen content of growing cultures, 61

N

Nashville meeting, 97
NASSET, E. S., Burning quality of tobacco, 185
Nitella, accumulation of ions in cells, 473
Nitrogen, content of *Mycoderma* and *Saccharomyces*, 61
inorganic, determination, 499
international conference, 360
metabolism in soy beans, 31
starvation, 248
Notes, 97, 231, 359, 519
Nutrition, plant, in relation to triangular water cultures, 441

O

Oats, 264
Officers, American Society of Plant Physiologists, 1928–1929, 359
O'GARA, PATRICK J., Obit, 232
OLSON, OTTO, Burning qualities of tobacco, 185
Osmotic coefficients, 420
pressure, 413
values, 413, 418
OWEN, F. V., Sterile character in soy beans, 223
Oxygen, photosynthesis in absence of, 85

P

Parsley, 201
Pea, 237

Periodic precipitation, studies in, 101
Petrol ether, lipide solvent, 163
purification of chlorophyll, 490
Phosphorus, 295
starvation, 250
Photosynthesis in absence of oxygen, 85
Physical chemistry and biophysics, MATTHEW STEEL, 99
Physicochemical reactions, similar to biological, 79
Physics and chemistry, handbook, 524
Physiology, plant, in Russia, 353
of sterile soy bean, 223
Phytol, 496
Pine, loblolly, seed germination, 400
lodgepole, seed germination, 399
longleaf, seed germination, 401
pitch, seed germination, 386
red, seed germination, 399
Scotch, seed germination, 402
western yellow, seed germination, 402
Pineapple protein, growth of fungi on, 80
stem colloids, 309
Pisum sativum, effects of absence of boron on structure of root tips, 237
Plant chamber, 286
extracts, determination of inorganic nitrogen, 499
material driers, 515
nutrition studies, triangular system, 441
physiology, principles of, 362
in Russia, 353
Plants, permanent wilting, soil moisture at, 355
zinc essential to growth of, 217
Portrait, TIMIRIAZEFF, 522
Potassium balance in relation to metabolism, 261
starvation, 413
Potato tubers, respiration, 49
Potentiometric titrations, I. M. KOLTHOFF, translation by FURMAN, 234
Precipitation, periodic, studies in, 101
Preparation of chlorophyll, 487
Pressure, osmotic, 413
Principles of plant physiology, ORAN L. RABER, 362
Prize, STEPHEN HALES, 361
committee on award, 232
fund, STEPHEN HALES, 97
Program committee, 99
Publication costs, 521
Purdue section, 232
University, summer meeting, 361
Purification of salts, 240

R

RABER, ORAN L., Principles of plant physiology, 362
Reaction, muck-soil, related to growth of leaf vegetables, 199
Reactions, biological similar to physicochemical, 79
Red kidney beans, zinc and growth, 219
Reduction measurements in seed viability studies, 335
Reprints, cost of, 521
Respiration, effect of accumulated carbon dioxide on, 45
of apple twigs, 47
of potato tubers, 49
of wheat, 50
Ripening, effect of sunshine and shape of fruit on tomato, 513
ROBBINS, W. W., Elements of botany, 524
Root anatomy, *Iriartea exorrhiza*, 466
Root and top ratios, 207
Root tips, effects of absence of boron on structure of, 237
ROSA, JOSEPH TOOKER, Obit, 522
ROSENBLOOM and GIES's classification of lipides, 158
ROSENHEIM's classification of lipides, 157

S

Saccharomyces cerevisiae, nitrogen content, 61
Salts, purification, 240
Sand cultures, wheat, 4
VAN DE SANDE-BAKHUYZEN, H. L., Studies upon wheat grown under constant conditions, 1, 7
SANDO, CHARLES E., Lipides and their estimation, 155
SAYRE, J. D., Development of chlorophyll, 71
SCHERTZ, F. M., Investigations on chlorophyll, translation of WILLSTÄTTER and STOLL, 99

Extraction and separation of chlorophyll, carotin, xanthophyll, 211
Quantitative determination of chlorophyll, 323
Preparation of chlorophyll, 487
Section, Purdue, 232
Seed, coniferous-tree, germinative energy, 365
germination, bibliography, 233
viability, biochemical studies of, 335
Seedlings, development of chlorophyll in, 71
Seeds, for investigational purposes, 360
SESSIONS, A. C., Method for determination of inorganic nitrogen in plant extracts, 499
Shape of fruit, effect on rate of tomato ripening, 513
SHIVE, J. W., Method for determination of inorganic nitrogen in plant extracts, 499
SIDERIS, C. P., Physicochemical and biological reactions, similarity, 79
Properties of pineapple stem colloids, 309
Soil moisture, at permanent wilting of plants, 355
Solubility of aluminum compounds, 294
Solvents, lipide, 163
SOMMER, ANNA L., Essential nature of zinc for growth of plants, 217
Effects of absence of boron on cell and tissue structure, 237
SOROKIN, HELEN, Effects of absence of boron on cell and tissue structure, 237
Soy bean, nitrogen metabolism, 31
Soy beans, sterile character in, 223
Spectrometric determination of chlorophyll, 327
Spectrum test of chlorophyll, 496
Spruce, Engelmann, seed germination, 402
white, seed germination, 403
Starch chemistry, ROBERT P. WALTON, 362
Statistical methods for research workers, FISHER, 525
STEEL, MATTHEW, Physical chemistry and biophysics, 99
Sterile character in soy beans, 223
STOLL, ARTHUR, Investigations on chlorophyll, translation by SCHERTZ and MERZ, 99
Structure of cells and tissues, effects of absence of boron on, 237
STYER, J. F., Effect of H-ion on growth of *Agaricus*, 91
Suction tension, 413, 425
Sulphur starvation, 245
Summer meeting, Purdue University, 231, 361, 519
Sunshine, effect on rate of tomato ripening, 513
Symposium, colloid, sixth national, 98, 231, 359

T

Tables, international critical, 233, 523
Temperature control, 286
effects on periodic precipitation, 117
high, and growth of cabbage, 95
incubation, and germinative energy of coniferous-tree seed, 365
Tension, suction, 413, 425
Textbook of general botany, Wisconsin, 524
THUDICHUM'S classification of lipides, 157
TIMIRIAZEFF, CLEMENT ARKADEVITCH, portrait opposite p. 226
portrait obtainable, 522
and the TIMIRIAZEFF Agricultural Institute, 227
Tissue structures, effects of absence of boron, 237
Tissues, vegetable, estimation of lipides in, 155
Titrations, potentiometric, I. M. KOLTHOFF, translated by FURMAN, 234
Tobacco, burning quality, relation of leaf constituents, 185
Tomato fruits, effect of sunshine and shape of fruit on rate of ripening, 513
Toxicity, aluminum, 293
Transmission curves, glass screens, 72, 73
Triangular system of water cultures, plant nutrition studies, 441
Trichlorethylene, lipide solvent, 166
Trichomes, periodic precipitation in, 102

V

Vaccinium, hardiness of certain species, 155
Value, osmotic, 413
Vegetable tissues, estimation of lipides in, 155
Vegetables, leaf, muck-soil reaction and growth of, 199
VEIHMEYER, F. J., Soil moisture at permanent wilting of plants, 355
Viability, seed, biochemical studies of, 335

W

WALTON, ROBERT P., Starch chemistry, 362
Water cultures, triangular system, plant nutrition studies, 441
Water requirements, 208
WEBSTER, J. E., Nitrogen metabolism in the soy bean, 31
Wheat, 265, 279
  buffer system, changes during development, 131
  respiration, 50
  studies under constant conditions, 1, 7
WILLAMAN, J. J., Effect of carbon dioxide on respiration, 45
WILLSTÄTTER, RICHARD, Investigations on chlorophyll, translation by SCHERTZ and MERZ, 99
Wilting, permanent, soil moisture at, 355
Windsor beans, zinc and growth, 219
WOOD, A. G., Two plant material driers, 515

X

Xanthophyll, 489
  extraction from fresh leaves, 211

Z

Zinc, evidence of essential nature for growth of plants, 217